

### **REMARKS**

The Office Action of March 24, 2010 has been reviewed and the Examiner's comments carefully considered. Claims 11-17 and 19-25 are pending in this application.

#### **I. The Prior Art Is Improperly Cited Against the Present Application**

Applicants traverse the rejection of claims 11-17 and 19-25 under 35 U.S.C. §103(a) as being obvious over United States Patent Application Publication No. 2004/0042965 to Usui et al. on the basis that Usui has been improperly cited as prior art.

The present application is the national phase of PCT/IN03/00148 filed April 7, 2003. Thus, under 35 U.S.C. §363, the filing date for the present application is April 7, 2003. Furthermore, priority was properly claimed in the international stage and a certified copy of the priority document has been received from the International Bureau by the United States Patent and Trademark Office. Therefore, for prior art purposes, the present application is entitled to the filing date of the priority application, June 5, 2002.

35 U.S.C. §102(a) states that an Applicant is not entitled to a patent if "the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent" and 35 U.S.C. § 102(b) states that an Applicant is not entitled to a patent if "the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States". Thus, to qualify as prior art under §102(a) or §102(b), the publication date of the cited reference must be at least prior to the filing date of the U.S. application. The publication date for the cited prior art reference, US 2004/0042965, is March 4, 2004, which is after both the international filing date (April 7, 2003) and the foreign priority date (June 5, 2002) of the present application. Thus, Usui may not be considered prior art under 35 U.S.C. §102(a) or 35 U.S.C. §102(b).

35 U.S.C. §102(e) states that an Applicant is not entitled to a patent if "the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by

the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language". Thus, a prior art reference which is the national stage of an international application only has a §102(e) date if the original international application designated the United States and was published in English. Otherwise, the reference is prior art only as of its publication or grant date (M.P.E.P. §2136.03(II)). The cited prior art reference, US 2004/0042965, is the national phase application of PCT/JP02/11097 filed October 25, 2002. The international application designated the United States but was published in Japanese, not English. The bibliographic information from the WIPO website (Exhibit 1) and a copy of the cover page of PCT/JP02/11097 (Exhibit 2) are attached attesting to these facts. Therefore, US 2004/0042965 has no §102(e) date and can only be considered as prior art as of its publication date under §102(a) or §102(b).

Thus, Applicants respectfully assert that United States Patent Application Publication No. 2004/0042965 to Usui et al. has been improperly cited as prior art against the present application.

## **II. Even Considering the Cited Prior Art the Invention Is Not Obvious**

As the Applicants believe that United States Patent Application Publication No. 2004/0042965 to Usui et al. has been improperly cited to reject claims 11-17 and 19-25 under 35 U.S.C. §103(a) as being obvious, no further arguments are believed to be necessary at this time. However, should the Applicants be incorrect in this assessment, the following brief discussion of how the present invention may be considered to differ from Usui is offered.

The Examiner asserts that Usui teaches a composition that overlaps the claimed composition of independent claims 11 and 20 and that a person skilled in the art would have been motivated to modify the composition disclosed in Usui to find workable ranges within the broadly disclosed ranges. Applicants respectfully disagree.

Usui discloses a heat-generating composition that is based on a chemical reaction. It is necessary that the composition of Usui be exposed to oxygen in order for heat generation to begin as it is stated throughout the application that a heat-generating substance generating heat

upon reaction with oxygen must be used. The heat-generating composition of the present application is based on an electrochemical reaction, wherein heat is generated upon a reaction with water. No exposure to atmospheric oxygen is necessary for heat generation to proceed. Usui in no way teaches or suggests a heat-generating composition that can be activated by water, even in the absence of atmospheric oxygen. The water component of the composition of Usui is merely added to assure that the composition will have adequate flowability to allow it to be molded without running off the mold and failing to maintain its shape (Usui at paragraph [0107]).

Further, the heat-generating reaction of Usui relies only on the presence of one metal, preferably iron. When the metal is exposed to oxygen, an oxidation reaction occurs, creating heat. The claimed composition must include at least two metals, aluminum and magnesium, for heat generation. When the claimed composition is exposed to water, an electrochemical reaction with the magnesium is initiated and the temperature begins to rise. After the temperature has risen, the aluminum becomes active and begins to take part in the electrochemical process (page 9, lines 6-19 of the original application). Absent the heat created by the initial reaction of the magnesium, the aluminum reaction will be very slow and only low temperatures will be generated.

The difference between the heat-generating reaction of the Usui composition and that of the claimed composition can be clearly seen when comparing Figs. 3 and 4 of Usui with Fig. 1 of the present application. For the disclosed composition of Usui, after exposure to air, the heat generation never exceeds 40°C and begins to decrease after about 6 hours. On the other hand, the claimed composition, when exposed to water, reaches temperatures of greater than 100°C and does not fall to temperatures below even 60°C for at least 14 hours. Such heat generation is not expected based on the teachings of Usui and is the result of more than mere optimization of the disclosed composition of Usui. The claimed composition takes advantage of the completely different electrochemical reaction described above, which is neither taught nor suggested by Usui. Further, Usui provides no motivation to modify its composition to utilize such an electrochemical reaction to generate more heat for a longer period of time.

It should also be noted that, in the claimed composition, iron is not added as a heat-generating substance, as taught by Usui. The iron, when it is added, acts as a cathode for the electrochemical reactions taking place with the magnesium and aluminum, and remains passive.

In addition, with respect to independent claim 20, it is recited, *inter alia*, that the ingredients must be prepared in a ball mill and have fine particle sizes (Mg: 1-500  $\mu\text{m}$ ; Al: 2-100  $\mu\text{m}$ ; Fe: 20-200  $\mu\text{m}$ ). This is necessary to insure intimate contact within the composition at the microscopic level in order for the electrochemical reaction, and, thus, the heat generation to occur. Usui, on the other hand, teaches only that the method of mixing the ingredients is not limited as long as uniform mixing may be achieved. Usui in no way teaches or suggests the use of a ball mill or that the active ingredients must have fine particle sizes, as recited in independent claim 20, since such intimate contact between the ingredients is not necessary for the chemical reaction relied upon in Usui to occur. In fact, Usui even teaches the use of "crosslinking aggregation", wherein a polymer is placed between the particles reducing their contact with one another (paragraph [0031]). In addition, since the teachings of Usui in no way indicate that intimate contact between the ingredients is required or even desired, a person skilled in the art would not be motivated to take on such detailed mixing of the active ingredients, which can take several hours (see examples 1 and 2 in the present application), or the use of such fine particles.

Thus, Usui neither teaches or suggests a heat-generating composition based on an electrochemical reaction that relies on the presence of both aluminum and magnesium to achieve temperatures of over 60°C for over 16 hours, nor does it motivate a person skilled in the art to modify its teachings to create such a composition. Therefore, Usui does not render independent claims 11 and 20 obvious.

In addition, claims 12-17, 19, and 21-25, being dependent on claims 11 or 20 and further defining the invention, are non-obvious over Usui for at least the same reasons.

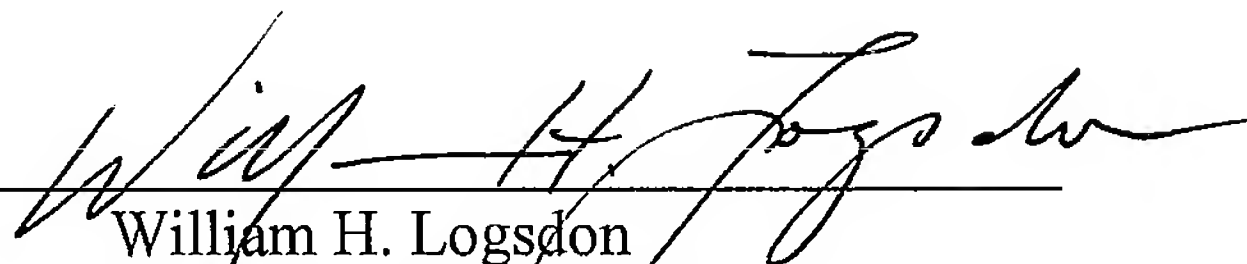
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### **III. Conclusion**

Based on the foregoing remarks, reconsideration of the rejections and allowance of claims 11-17 and 19-25 are respectfully requested.

Respectfully submitted,  
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